

MARCH 2, 2009

# C&EN

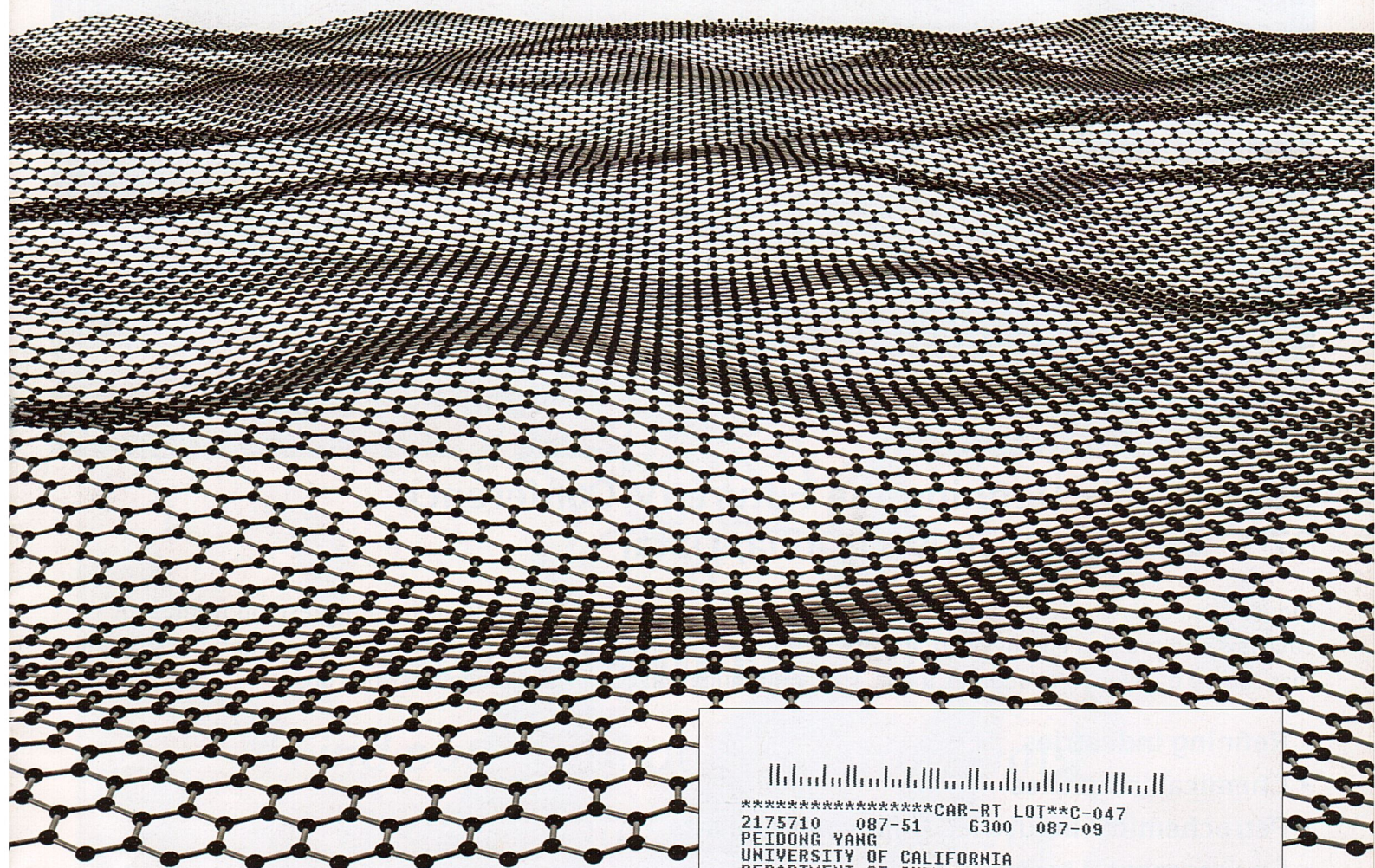
CHEMICAL & ENGINEERING NEWS

## STIMULUS FUNDING

Key science agencies look to spend their share **P.36**

## ACS IN SALT LAKE CITY

Events planned for national meeting **P.57**



\*\*\*\*\*CAR-RT LOT\*\*C-047  
2175710 087-51 6300 087-09  
PEIDONG YANG  
UNIVERSITY OF CALIFORNIA  
DEPARTMENT OF CHEMISTRY  
HILD HALL B68  
BERKELEY CA 94720-0001

46  
0001  
5534-4

## GRAPHENE ON THE HORIZON

Thinnest carbon is thick with promise **P.14**



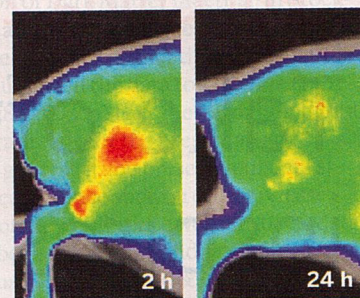
PUBLISHED BY THE AMERICAN CHEMICAL SOCIETY



## SHORT-GLOW NANOPARTICLES

## STREAMLINED WAY TO LABEL GLYCOPROTEINS

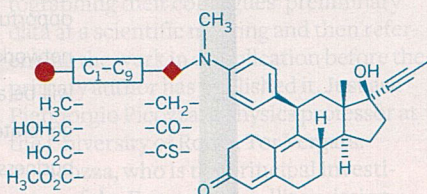
The first fluorescent nanoparticles that can circulate in the blood and quickly degrade into nontoxic by-products could also help medical professionals image tumors and deliver cancer-fighting drugs. Michael J. Sailor of the University of California, San Diego, and colleagues developed the porous nanoparticles from silicon wafers (*Nat. Mater.*, DOI: 10.1038/nmat2398). Although other fluorescent nanoparticles such as quantum dots are available for imaging studies, he says, the brightest dots contain toxic cadmium selenide, whereas silicon is a nutrient for humans. In addition, porous silicon can carry drugs, unlike most nanoparticles, which are solid. The researchers, with the anticancer drug doxorubicin, injected the particles into mice and demonstrated with imaging that the particles



*Sugar-coated nanoparticles (red) gravitate to a tumor in a mouse's hindquarter, quickly degrade, and are eliminated via urine.*

## SYNTHETIC STEROID GARNERS WIDER ROLE

Mifepristone, better known as RU-486, is a synthetic steroid that outcompetes the pregnancy steroid hormone progesterone in binding to progesterone receptors. As a result, mifepristone is effective at inducing abortion and as a contraceptive. A research team led by Wolfgang S. L. Strauss of the University of Ulm, in Germany, and Hans-Wolfgang Schramm of the University of Graz, in Austria, now reports the synthesis of mifepristone derivatives that could take advantage of the drug's progesterone-receptor binding to advance diagnostic imaging and cancer treatment (*J. Med. Chem.*, DOI: 10.1021/jm800985z). The researchers replaced one methyl group of the steroid's dimethylaminophenyl substituent with various linker groups to which a fluorescein dye or additional anticancer drug can be attached. These conjugates could be designed to retain or cleave the dye or anticancer drug once mifepristone enters cancer cells. In breast cancer



### RU-486 derivatives

cell assays, the team identified several derivatives for which adding the linker nominally affects mifepristone's bioactivity, a prerequisite to making the strategy practical.—SR

## CHROMATOGRAPHY IN AN NMR TUBE

Getting NMR spectral data on the product of a chemical transformation usually means separating the molecule from the reaction's starting material, intermediates, and side products via chromatography. Now, Sami Heikkinen and coworkers of the University of Helsinki, in Finland, have developed a way to resolve this witches' brew in an NMR tube using an inexpensive, commercially available polymer (*Org. Lett.*, DOI: 10.1021/ol9001398). The method employs diffusion-ordered NMR spectroscopy, or DOSY, which separates the spectra of individual compounds in a mixture according to the compounds' diffusion rates. The researchers liken the technique's ability to separate analytes to thin-layer chromatography (TLC). Because insoluble silica—the stationary phase used in TLC—would severely compromise the quality of the NMR spectra, the researchers chose soluble polyvinylpyrrolidone as the “stationary phase” to enhance diffusion. “This method provides a fast, cheap, and simple technique to resolve the NMR spectra of complex mixtures,” the authors write.—BH